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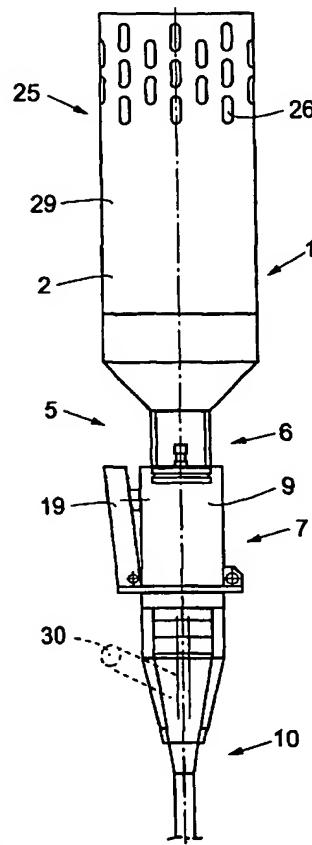
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: IMPROVEMENT IN OR RELATING TO A HOT AIR AGGREGATE



(57) Abstract: The invention relates to an arrangement in a hot air aggregate comprising a cover (2) having a built-in fan (3), an enclosed chamber (4) after said fan (3) which extends into a conically formed, front portion (5), to which a burner unit (7) having an enclosed burner (9) supplied with a gas flow and a nozzle (10) are provided via a connecting coupling sleeve (6). Said fan (3) is fixed via a sealing means (11) against an inner tube (12) insulated from said cover (2) and delimits the back portion (13) of the enclosed chamber (4) and its opposite front portion (14) extends into the conical portion (5), which comprises on its inner mantle surface (15) inclined wings to give the streaming air through the same an extra rotation before its passage into the burner (9), said chamber (4) comprises an air guard (16) for sensing the right air flow into the burner (9) at the same time as in front of or after said fan (3) there are within said cover (2) integrated an electronic controlling unit (17) and a magnetic valve (18) for adjusting of air- and gas flows, said burner unit (7) comprises an adjusting means (19) for ignition and starting of the fan (3) when the pressure has been increased sufficiently in the chamber (4) at the same time as a sensor gives a signal to said magnet valve (18) to open said gas supply for ignition of a gas flame enclosed in the burner, and said nozzle (10) is double mantled having the possibility of cooling by aid of cooling air in the gap space (20) of the double mantle (21).

Improvement in or relating to a hot air aggregate

The present invention refers to an improvement in a hot air aggregate comprising a cover having a fan built into the same, a closed chamber after the fan which extends into a conically formed, front portion, to which a burner is connected through a connecting sleeve, said burner is supplied with a gas flow and a nozzle. The hot air aggregate according to the invention is primarily intended to be used in a welding machine for applying a roof covering material.

Presently, different types of devices are used during the application of roof covering material and one example of such a device is a movable wagon having wheels and rollers, which is intended to join together two unrolled rolls of roof covering in connection to a joint. This is made in such a way that respective roof covering material in the joint area is heated by hot gas, which by aid of a nozzle is blown into the joint at the same time as the wagon is moved forward and by aid of its pressing roller presses together the covering layers lying on top of each other, said layers constitute the joint when the wagon is moved forwards, so that the melted material from the roof covering forms an adhesive. Usually these welding machines comprise a LPG-tube from which a gas is supplied through a strong supplying pipe up to a hot air burner situated in the end of the gas pipe, where there is a nozzle, through which the hot gas can be fed out. By placing the hot gas burner immediately before said nozzle a totally closed combustion occurs, so that only a mixture of nitrogen and carbon dioxide remains in the hot gas flowing out from said nozzle. This means that in the present case it is not the question about a totally open

flame as in the normal case, i.e. from direct flowing of gas from for example a LPG-source which can result in that the warming up area starts to burn. One problem with this type of hot gas burner is that it is difficult to handle
5 owing to its heavy, ungainly design, and complicated control functions for adjusting of the air- and gas flow. Further there is a large risk of burning at the nozzle in this design, which in use has a very high temperature.

10 The object of the present invention is to provide a new type of hot air aggregate which eliminates the problem mentioned above, and which has a design which is easy and simple to handle having integrated adjusting functions for air- and gas flow. The characterizing
15 features of the invention are stated in the claims enclosed.

Thanks to the invention a hot air aggregate has been provided which in an excellent way fulfills its purposes at the same time as it also is cheap and easy to manufacture. The flexibility of the aggregate is attained by means of primarily the supplying pipes for gas and electricity to the motor and possible any hand burners and also sensors of different kind for adjusting of air-
25 and gas flows are integrated in the design itself. The burner unit itself comprises according to the invention a press button for ignition and start of the fan, when the pressure has been increased enough, so that a pressure guard gives a signal to a magnetic valve, which opens the supply of gas, so that the aggregate is ignited. In the closed chamber, which is located after the fan, also an air guard is provided, which during insufficient gas flow automatically shuts off said burner. Furthermore, the
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nozzle has been provided with a double mantle for eliminating risks of burning.

The invention is described in more detail below
5 by means of a preferred embodiment example during reference to the drawings enclosed, in which,

Fig. 1 shows a schematic side view of a hot air aggregate according to the invention, partly in
10 exploded view,

Fig. 2 shows a side view of the hot air aggregate illustrated in Fig. 1 in a mounted state,

15 Fig. 3 is a schematic cross section through the burner, showing the outer cover having an inner tube provided in the same and insulated therefrom for constituting a place for the fan and also a closed chamber after the same,

20 Fig. 4 is a schematic, partial, perspective view partly in section of the hot air aggregate illustrated in Figs. 1 and 2, and

25 Fig. 5 shows an example of a gable for the actual hot air aggregate.

As can be seen in more detail from the drawings a preferred example of a hot air aggregate 1 according to
30 the invention is illustrated, which comprises a cover 2 having a built-in fan 3, a closed chamber 4 after the fan 3, which extends into a conically formed, front portion 5. In the front portion 5 a burner unit 7 and a nozzle 10 are provided in a connecting sleeve 6. An enclosed burner 9 is

provided in the burner unit 7, said burner is supplied with a gas flow from a gas pipe 8.

In the embodiment illustrated the fan 3 is fixed
5 via sealing means 11 against an inner tube 12 which is
insulated from said cover 2 and at the same time delimits
the back portion 13 of the closed chamber 4 while its
opposite front portion 14 extends into the conical portion
5. The conical portion 5 is provided with wings on its
10 inner mantle surface 15, not illustrated on the drawing,
in order to give the flow air through the same an extra
rotation before its passage into the burner 9. The chamber
4 has an air guard 16 in the form of a bent pipe 17 in
order to determining the right flow of air to the burner 9
15 at the same time as upstreams or downstreams said fan 3
there are integrated inside said cover 2 an electronic
adjusting unit 17 and a magnetic valve 18 for adjusting of
air- and gas flows. The burner unit 7 comprises an
adjusting means 19 by aid of which the starting of the fan
20 3 can take place and an ignition of a gas flame within
said burner 9, if the pressure is increased enough in said
chamber 4 at the same time as a sensor, not closer
illustrated on the drawing, gives a signal to said
magnetic wall 18 to open the gas supply for ignition of
25 the gas flame in the burner. In the example illustrated
the nozzle 10 is double mantled having a possibility of
cooling by aid of cooling air in the gap space 20, which
said double mantle 21 comprises.

30 The gap space 20 in said double mantling 21 of
said nozzle 10 comprises an insulating material 22
preferably in the form of a ceramic layer on the inside 23
of the outer mantle 24. The back portion 25 of the hot air
aggregate 1 comprises air intakes 26 in its back gable

wall 27 and/or in the back area 28 of the sides 29 of the cover 2.

In the present case the nozzle 10 can be provided
5 with a branch off means 30 for connecting of a traditional, electrically driven hot air gun for increasing of the effect of the outstreaming hot air.

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Claims

1. An arrangement for a hot air aggregate comprising a cover (2) having a built-in fan (3), a closed chamber (4) after said fan (3) which extends into a conically formed front portion (5) to which a burner unit (7) with an enclosed burner (9) supplied with a gas flow and a nozzle (10) are provided via a connection sleeve (6), **characterized in that** said fan (3) is fixed via sealing means (11) against an inner tube (12) insulated from said cover (2) and delimits in the longitudinal direction of the hot air aggregate (1) the back portion (13) of the enclosed chamber (4) and its opposite front portion (14) extends into the conical portion (5), showing on its inner 15 mantle surface (15) inclined wings for giving the air supplied through the same an extra rotation before its passage into the burner (9), said chamber (4) comprises an air guard (16) for sensing the right air flow up to the burner (9) at the same time as in front of or after said 20 fan (3) there are integrated within said cover (2) an electronic controlling unit (17) and a magnetic valve (18) for adjusting of air- and gas flows, said burner unit (7) comprises adjusting means (19) for ignition and starting of said fan (3) when the pressure has been increased 25 sufficiently in the chamber (4) at the same time as a sensor gives a signal to the magnetic valve (18) to open the gas supply for ignition of a gas flame enclosed in the burner, and said nozzle (10) is double mantled having the possibility of cooling by aid of cooling air in the gap 30 space (20) of the double mantle (21).

2. An arrangement according to Claim 1, **characterized in that** the gap space (20) in the double mantle (21) of the nozzle (10) is provided with an

insulating material (22) preferably in the form of a ceramic layer on the inside (23) of the outer mantling (24).

5 3. An arrangement according to Claim 1,
characterized in that the back portion (25) of the hot air aggregate (1) is provided with air intakes (26) in its back gable wall (27) and/or in the back area (28) of the sides (29) of the cover (2).

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4. An arrangement according to Claim 1,
characterized in that said nozzle (10) comprises a branch off means (30) for connection to a traditional electrically driven hot gun for increasing the effect of
15 the outcoming hot air.

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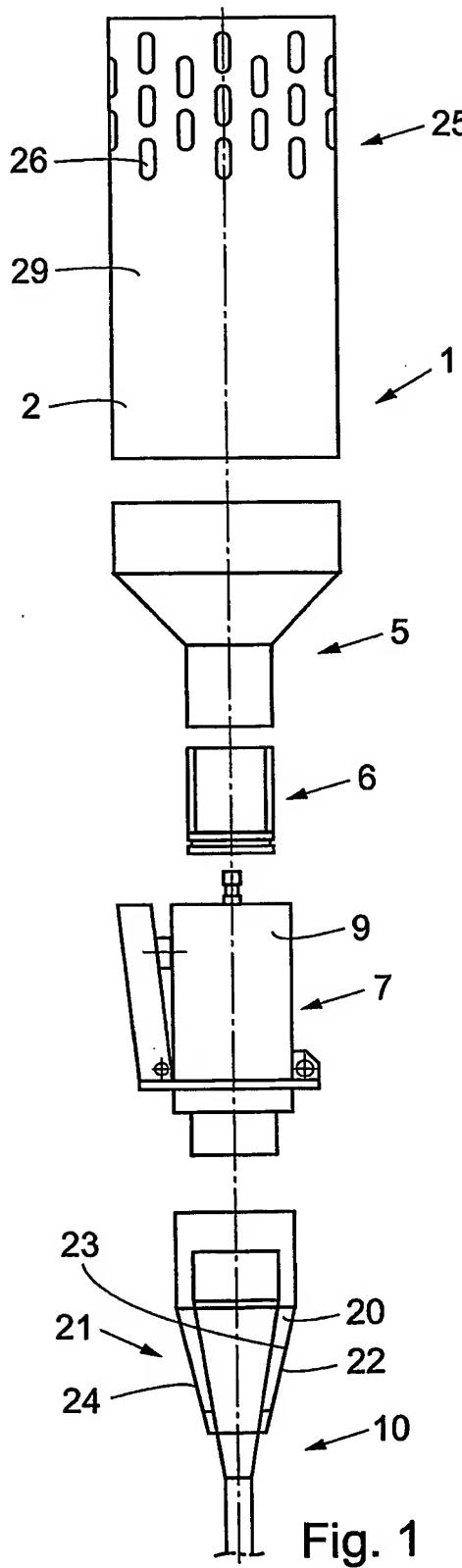


Fig. 1

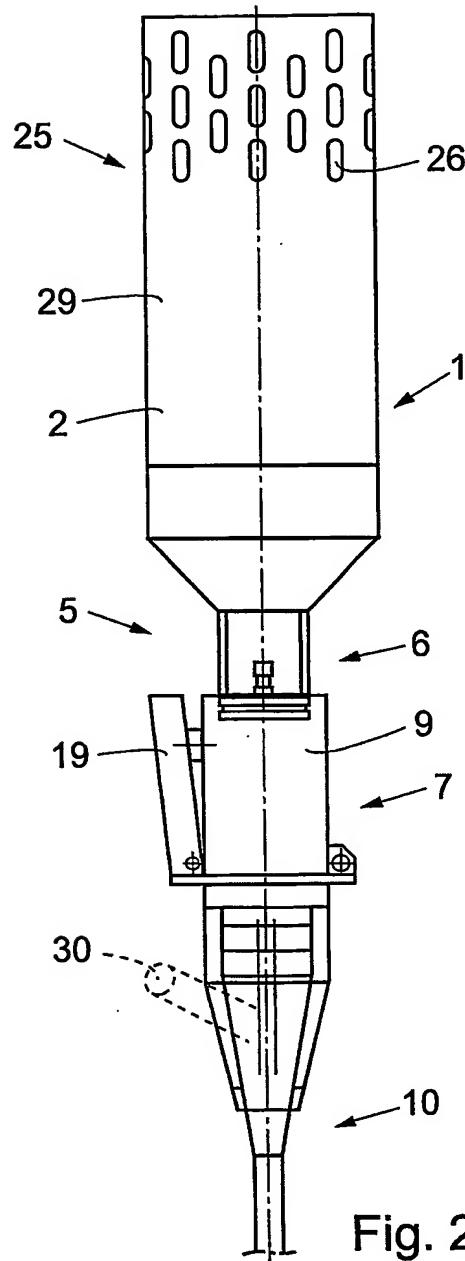


Fig. 2

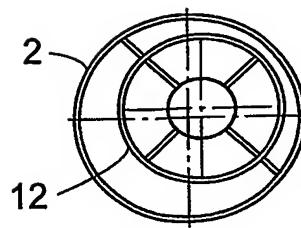


Fig. 3

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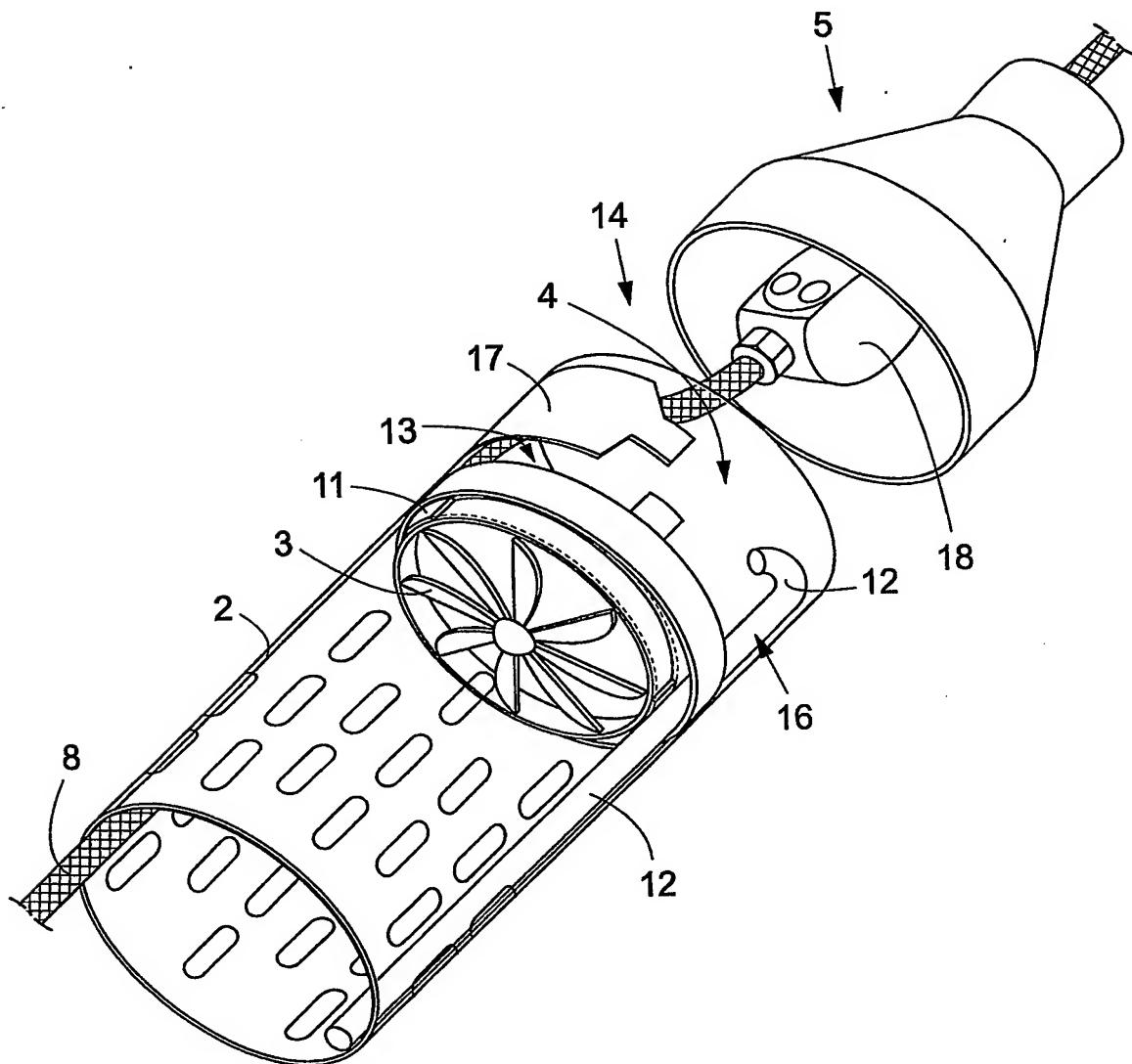


Fig. 4

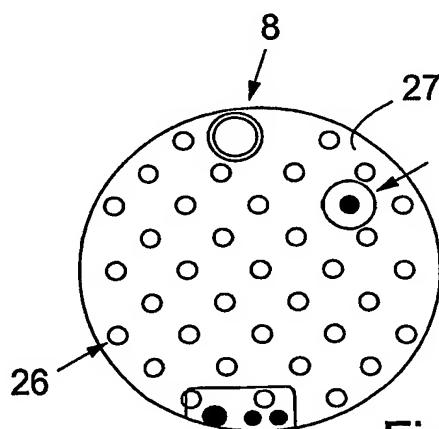


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01046

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F23D 14/24, F23D 14/78, E04D 3/369, B23K 5/00
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F23D, E04D, B23K, F23H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 29606718 U1 (MAGASS, WALTER), 25 July 1996 (25.07.96), figures 1-6, claims 1-15 --	1-4
A	SE 9201578 A (AB MATAKI), 21 November 1993 (21.11.93) --	1-4
A	DE 19906389 A1 (MAGASS, WALTER), 24 August 2000 (24.08.00), abstract --	1-4
A	SE 461409 B (AB MATAKI), 12 February 1990 (12.02.90), abstract --	1-4

 Further documents are listed in the continuation of Box C. See patent family annex.

- * Special categories of cited documents:
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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01046

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0690274 A1 (SANDEN CORPORATION), 3 January 1996 (03.01.96), abstract -- -----	1-4

INTERNATIONAL SEARCH REPORT
Information on patent family members

26/07/03

International application No.

PCT/SE 03/01046

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE 29606718 U1	25/07/96	DE	19715374 A	30/10/97
SE 9201578 A	21/11/93	NONE		
DE 19906389 A1	24/08/00	NONE		
SE 461409 B	12/02/90	SE	8802388 A	28/12/89
EP 0690274 A1	03/01/96	SE	0690274 T3	
		DE	69504146 D,T	11/02/99
		JP	8011523 A	16/01/96
		NO	304759 B	08/02/99
		NO	952592 A	02/01/96
		US	5653387 A	05/08/97